[*From the* PHARMACEUTICAL JOURNAL *for December*, 1852].

PHARMACEUTICAL MEETING—EDINBURGH.

THE Edinburgh branch of the Pharmaceutical Society held their first Meeting for the winter season on Monday evening, in the rooms, 72, Princes Street—Mr. J. F. Macfarlan, Vice President of the Scottish branch, presiding. The attendance was large—the room being crowded; and the whole proceedings were of a very interesting character. Among those present were Dr. Wilson, Dr. Douglas Maclagan, Messrs. Gardner, Baildon, Robertson, R. Raimes, Flockhart, Mackay, Dunn, Smith, Davenport, Bremner, Blanshard, Aitken, Shaw, Fairgrieve, Ainslie, &c. &c.

The CHAIRMAN then rose and said—I rise with pleasure to address you on this occasion, and to express my expectation that this the first meeting which we have held of a scientific character will prove the first of a series at once interesting and instructive—interesting in regard to the matters which may be brought before us, and in regard to the manner in which these may be handled, and instructive in regard to the information communicated, the illustrations with which the information may be accompanied and the clearness and precision with which it is expressed. I shall assume that you are all sufficiently acquainted with the fact that the Pharmaceutical Society, for some years sanctioned by Royal Charter, has now had that charter confirmed by Act of Parliament, and I therefore shall not waste your time with any details on the subject; suffice it to say, that it was to the unwearied perseverance, the untiring energy, the indomitable firmness of Mr. Jacob Bell, that we are indebted for the passing of that Act under which we have now assembled for the first time as a corporation, sanctioned by the Legislature of the country. We are also indebted in no ordinary degree as a body, to Dr. Wilson, Sen., Physician to St. George's Hospital, London, Mr. South, President of the Royal College of Surgeons there, for the manner in which they supported our cause, and also to Dr. Douglas Maclagan, of this city, whose testimony in favour of the Society might well outweigh, as it did outweigh, a host of testimony of an opposite character. I might advert also to the steady and honourable support which has always been afforded by Professor Christison, whose absence this evening we must all much regret. I might also advert to Dr. Wilson, and others of a kindred spirit, whose kindness and support cannot fail to encourage and aid us in the path on which we have entered. It has been asked by some, What benefit is this Act, so meagre in their views, to confer upon the Chemists and Druggists of the country? To this I would answer, first, it has incorporated into one body, under the authority of the Legislature, those who were disunited before, those who had no common bond of union. Isolated in their position, they had no sympathy with one another. Like the Ishmaelites of old every one's hand was against his fellows and they against him. The Act, however, has given them a bond of union, and, by uniting them into one body, it has given them a common interest, and, at the same time, a higher standing. It has placed them on such a footing that if one Member suffer, all will suffer with him. If one Member be aggrieved, all may be called upon to aid in removing the cause of injury, or, if they cannot do so, at least they will be able to alleviate and sustain. In such a body, raised by the Act of the Legislature to the dignity of a corporation, the selfishness of individual interests, the mean jealousy which, alas, has too often characterised the conduct of individuals, the underhand efforts to supplant their neighbours and to obtain their business, not by the fair and honourable competition which ought ever to prevail, but by making insinuations and holding out inducements unworthy of men even in an isolated condition. These and such as these can find no place, no standing ground, in a body united together by such a tie. Men acting together as members of such a corporation cannot descend so low, or be influenced by motives such as these. To accomplish such an object—to unite together in bonds of friendship, or at least of harmonious co-operation—is no mean achievement, and, if this be accomplished by the passing of this Act, it will not have been passed in vain. But the Act has given us a higher standing ground. The interest of the Chemist and Druggist can no longer be overlooked in any Act which may be passed for regulating the medical profession. And if we do occupy a higher standing ground in this respect, shall we not seek to occupy a higher standing-ground in regard to the qualifications required of those who would worthily maintain it. Our present position demands that we should not be satisfied with present attainments.

The present is not a day in which, in any department, one may lay the flattering unction to his soul that he has attained,—that he is already perfect. Look to Chemistry—what was it a few years ago ?—what is it now ? A science pervading every branch of human knowledge; guiding the farmer in his husbandry, the mechanic in the choice of his materials, the housewife in her culinary operations, and every man, more or less, in everything in which he is engaged—so great, so rapid, so wonderful is its progress, that, let the most learned of the Pharmaceutical Chemists of the present day rest contented with his present acquirements, and he will soon be left far behind even the youngest of his pupils. It is so in Chemistry, and is it less so in Pharmacy ? Can the man who would undertake the duty of a Pharmaceutical Chemist afford to be ignorant ? Yes, say some. If he knows but enough to weigh up a powder, to measure out a liquid, to mix up an ointment, that will do. Should he know more he will intrude on our province, he will prescribe, he will become a medical man—*Risum teneatis amici.* Will a man weigh a powder less carefully, that he knows of what that powder is composed ? Will he measure out the liquid with less exactness if he can tell the contents of that liquid, and be able to explain the chemical action which may take place when the different ingredients of the prescription are mixed together ? Or will he mix the ointment with less care that he is able to distinguish strychnine from bismuth. The idea is absurd. It is founded on a mistake. I would say that the best-educated man among you will be the first to advise those who may ask his aid to call in the regular physician; for he will best know the danger of delay, and will be least inclined to take upon himself the responsibility of prescribing when he is aware that life or death may be the issue. The requirements of the present day are such that nothing less than the highest attainments will suffice. "A little learning is a dangerous thing." A half-fledged Pharmaceutical Chemist may do mischief—a well-informed, a well-educated one may and will do good. It is impossible for such a man to be too well informed. Sure I am, that every intelligent physician would rejoice were he assured that, wherever his prescriptions were sent, they would be carefully prepared: he would then be relieved from all anxiety, for he would know that what he had ordered would be administered, and that thus the patient would receive the full benefit of his matured experience.

"PROBITY," says Dr. Renodœus, Chief Physician to the King of France, "is not so requisite in a Philosopher as an Apothecary, whose sole work is to prepare medicines for the Physician's administration, either in preserving or procuring health, for in his hands consists health and sickness, life and death; and he hath free power in the composure of his physic, not only to obstruct the current of health, but also to deprive us of life, when he is wickedly bent thereunto, either out of malice or ignorance, so that if Hippocrates be honest and upright, it is no matter if Socrates be a knave.

"But first of all, an Apothecary ought to be a lover of piety, one that fears God, void of envy and malice, of a sound judgment, well skilled in grammar, of a good competency, not covetous, patient of labour, of great industry, not given to corpulency and epicurism, one that makes conscience of his actions: for an Atheist, as he doth not respect the Creator, so neither the creature ; and an envious man repines at another's man's good, and a foolish man hath an inseparable property in him, viz., a desire to hurt ; and the unskilful thinks nothing right but what he doth himself, and the covetous man is good to none, worst to himself ; and a poor man is easily corrupted, for need will compel him to deal dishonestly*."

But I must hasten to a close. I need not point out the advantages which each Member of this body will confer upon the rest by communicating in papers (which we would gladly receive) longer or shorter details of his experience; for there is no one so little versed in practical details that he may not furnish something valuable to the body at large. I will only say that, to the intelligence, the zeal, the industry, and public spirit of the Members, the Association looks, and I trust will not look in vain, for redeeming the profession from the low and degraded state in which it has hitherto been, and elevating it to that high position which it has long occupied on the continent, and which it ought to have occupied long ago in this free and happy land and enlightened age; so that should the variegated colours which have hitherto embellished the windows of the laboratory, and formed the emblem of his calling, be

* Renodœus' Dispensatory. Translated by R. Tomlinson, Apothecary, London, 1657.

still continued, they may at least mark, that whether the occupant be poor or rich, successful or unsuccessful, he is at least an intelligent and honest man, who, if he has not been able to command success, has done more—he has by his labours deserved it, while, by his upright character, he adorned the profession to which he belongs, and secured the esteem of all who knew him.

Professor Christison having been expected to address the Meeting, the Secretary read the following letter, explanatory of the Professor's absence:—

"*Moray Place*, 25*th October*, 1852.

"My dear Sir,—I have been conteuding all forenoon with a shivering and other seeds of what appears to be an influenza, but have put off till the last hour pleading this as my apology for non-appearance at the Pharmaceutical Society, in the hope that I might not be incapacitated from duty. I now find, however, that I cannot prudently go out this evening, more especially as our University Session is near at hand, and I have a great dread of being laid up, as I had the ill luck to be last year at the same period.

"I assure you that I regret this very much, not because I had anything to say particularly worthy of the Society's notice, but because I was anxious, by my presence, and by what I should have said, to convince the Society of the very sincere interest I take in its prosperity and proceedings.

"I trust very soon to be able to contribute more useful matter to its proceedings, however, than an opening address.

"I regret that, in consequence of more professional occupation than I had counted on, I was unable to look out some specimens which I had intended to present to the Meeting. In the department of ordinary drugs, I, of course, can be of little or no service to your Museum. But in the natural history of drugs in general, and in the Materia Medica of foreign countries, I may be able to contribute from time to time specimens equally interesting and difficult to procure. I have already several duplicates of this kind, such as the different East India opiums, Borneo camphor, true quassia, &c., which, if the Society will allow me, I shall take care to present at its next meeting.

"I beg you will assure the Society of my great regret that I cannot be present on the Inauguration-day; and that I shall be glad to contribute everything in my power to promote its objects and its prosperity.

"I am, yours sincerely,

"*John Mackay, Esq.* "R. Christison."

The Chairman then moved a vote of thanks to Professor Christison, for the kind and earnest manner in which he had expressed himself regarding the advancement and prosperity of the Pharmaceutical Society, and for the Professor's promise of donations to the Museum, which was most cordially and unanimously asseuted to, and the Secretary requested to communicate the same to Professor Christison.

ON SOME OF THE MORE IMPORTANT CHEMICAL DISINFECTANTS.

BY GEORGE WILSON, M.D., F.R.S.E.,
Hon. Member of the Pharmaceutical Society of Great Britain.

I consider it an acknowledgment due from me to the Pharmaceutical Society of Great Britain, which has honoured me with its diploma, that I should contribute a paper to the proceedings of its Edinburgh section, with which I stand more immediately connected. I have selected a subject, of special interest at the present moment, when we have reason to apprehend the appearance of cholera on our shores, but which is at all times a subject not less important than it is difficult. To discuss the entire question of disinfection would require many papers. I can only refer at present to some of its relations.

The term *disinfectant*, in strictness of language, can only be applied to those agents or substances which destroy or decompose infectious or contagious matter. But it is usually employed in a wider sense, so as to include not only *disinfectants proper*, but likewise *antiseptics* and *deodorisers*. Any attempt to draw a sharp line of demarcation between these three classes of agents, is rendered impossible by our almost total ignorance of the nature of contagious matter. Some substances, such as chlorine and sulphurous acid, possess at the same time, disinfectant, antiseptic. and deodorising powers. Some, like common salt, are probably simply antiseptic,

of others, such as the salts of the heavy metals, which are in high repute as deodorisers, it may be questioned whether they are of any value as disinfectants, although with some persons they rank at the head of the list. Without insisting, at present on this, it may suffice to define the bodies we are about to consider, thus: A Disinfectant is an agent which effects the chemical decomposition of organic poisonous matter—the term poisonous being used in a wide sense to include all the known or supposed causes of the development of disease, which are referred to under the names of miasma, malaria, infectious virus, contagious matter, &c.

An antiseptic is an agent which prevents or arrests the development of organic poisonous (or non-poisonous matter) without effecting its chemical decomposition.

A deodoriser is a substance which destroys odour, by decomposing or combining with, or absorbing odorous matter. Chlorine, for example, decomposes sulphuretted hydrogen, whilst a salt of lead decomposes it, and charcoal simply absorbs it.

Before considering the relative merits of particular substances belonging to these classes, it is necessary, however, briefly to discuss the important question—does the poisonous organic matter which occasions certain diseases, occur in the solid, liquid, or gaseous form? The certainty that prolonged exposure to a vitiated atmosphere, such, for example, as that of a fever ward, produces disease, has led to a conclusion in which probably all concur, that the air is one of the chief media through which disease is propagated, and this connection has in turn led to the much more doubtful inference that infectious matter is truly gaseous or vaporous. This view has probably been strengthened by the recent extensive study of the properties of anæsthetics, and by the many observations which have been made on the rapid and powerful action on the body of substances which enter it through the lungs. It has certainly also been deepened by the opinion, widely prevalent, that the gases which are evolved from cesspools, sewers, and stagnant waters in general, particularly sulphuretted hydrogen, hydrosulphuret of ammonia, and marsh gas (light carburetted hydrogen) are the *direct* and *specific* causes of ague and fever.

If this opinion were well founded, the limits and best modes of applying disinfectants could be determined without much difficulty, and our controul over infectious diseases would certainly be much greater than it is.

I think, however, that we may with confidence affirm that the great majority of diseases are not propagated by gaseous poisons The recent tendency to advocate an opposite opinion, has been mainly occasioned, I believe, by an opinion expressed by the late Professor Daniell to the effect that the fatal fever of the African coast is occasioned by sulphuretted hydrogen. This view was founded on an analysis of water brought from that coast, and determined the ventilating arrangements fitted up in the vessels which formed the disastrous Niger Expedition. It appears to have been extensively adopted by medical men.

During the freqnent prosecutions for nuisance, under the New Police Act, which took place in this city and elsewhere, during the last visitation of cholera, it occurred to me, and to other Chemists, to be constantly met by endeavours on the part of the prosecutor to compel an acknowledgement that sulphuretted hydrogen, hydrosulphuret of ammonia, and marsh gas or light carburetted hydrogen, which are confessedly given off by sewage waters, are the *direct* causes of fevers and other diseases. So long as this idea prevails, and men rest satisfied with it, as the true explanation of the mode in which fevers and similar maladies originate and are disseminated, they will cease to prosecute inquiry into the matter. It is most important, therefore, to discountenance the notion that we are acquainted with the true *materies morbi.*

That neither sulphuretted hydrogen nor hydrosulphuret of ammonia produces any special disease, may be sufficiently demonstrated by the impunity with which persons are known to expose themselves to much larger quantities of these gases than can possibly act on those who suffer from exposure to marsh miasmata. In these, the nicest tests have failed to give the slightest indications of sulphuretted hydrogen, and yet a few hours' exposure to such miasms has been enough to develope fever. On the other hand, in every analytical laboratory, sulphuretted hydrogen and hydrosulphuret of ammonia are daily respired for weeks or months together by those engaged in analysis, yet analytical Chemists certainly are not specially subject to fevers. At the Bonnington Chemical Works, where the ammoniacal liquor from the Edinburgh Gas Works is largely converted into sulphate and muriate of ammonia, the workmen are exposed to the hydrosulphuret of ammonia which forms so considerable a part of the liquor, and when it is neutralized with sulphuric and muriatic

acid, sulphuretted hydrogen is given off in such abundance as to blacken the silver coins and watches on the persons of the bystanders, and even (along with the carbonic acid simultaneously evolved) to render them temporarily insensible if they incautiously respire the gases. Yet no special malady is known to result from this exposure, and the Bonnington Works enjoy the reputation in the neighbourhood of protecting it from the inroads of endemic and epidemic diseases. Similar observations as to the non-deleterious effects of exposure to comparatively large volumes of sulphuretted hydrogen have been made at the metal works, where a superficial tarnish of metallic sulphuret is removed by washing with acids, and the workmen are freely exposed to the sulphuretted hydrogen evolved. I need not say, that I do not wish to affirm that this gas or its combination with ammonia, is not a powerful poison, if respired alone, or to deny that the continued entrance of either into the body, must debilitate it and prepare it for yielding to the attacks of disease. But that it is the cause of the fevers, which a very short exposure to the so-called malaria of certain districts infallibly occasions, I altogether disbelieve.

The alleged noxiousness of diluted marsh gas (light carburetted hydrogen), admits of more easy disproof, for were it the deadly agent it has been declared to be, our colliers who are exposed in coal-pits to much larger volumes of it than any other class of persons, should be to a corresponding extent sufferers from the diseases which it is supposed to occasion; but, unless when its mixture with air explodes, it is destitute of any injurious action on the pitmen, who are a healthy class of the community.

Another disease, namely influenza, has been imputed by high chemical authorities to the diffusion through the atmosphere of a peculiar gas. Dr. Prout regarding seleniuretted hydrogen as its cause, Schœnbein attributing its production to ozone. There is no evidence that either of these views is true, but much may be said in favour of the latter. The last severe epidemic of influenza spread over Europe with a rapidity which almost seems to point to a gas as the medium of its propagation. No one, however, has detected seleniuretted hydrogen in the atmosphere; and air largely impregnated with ozone, may be breathed with an impunity which throws grave difficulties in the way of Schœnbein's hypothesis.

Whilst thus, with the exception of influenza (if it is to be excepted), no gas is known to possess the power of developing an infectious or contagious endemic or epidemic; on the other hand, as Prof. Graham has justly remarked, such infectious matters as are accessible to us; for example, "the matter of cow-pox may be dried in the air, and is not in the least degree volatile. Indeed, the volatility of a body implies a certain simplicity of constitution and limit to the number of atoms in its integrant particle, which true organic bodies appear not to possess. Again, the source of such bodies being at all times inconsiderable, they would, if vapours be liable to a speedy attenuation by diffusion so great as to render their action wholly inconceivable. It is more probable that matters of contagion are highly-organized particles of fixed matter, which may find its way into the atmosphere, notwithstanding, like the pollen of flowers, and remain for a time suspended in it."*

To these statements it may be added, that all Chemists now acknowledge that volatility is not essential to the transference of solid bodies to the atmosphere, at least so far as those soluble in water are concerned; for observations on the largest scale have shown that the vapours of volatile liquids carry with them sensible quantities of all the solids which they dissolve; common salt, nitrate of potass, boracic acid, phosphoric acid, afford marked examples of this; but the list of salts soluble in water which accompany its vapour at temperatures at which when dry they are fixed, is endless.† The significant word "*Malaria*," therefore, which embodies in a single term, the evil reputation which the air or atmosphere has acquired, as the vehicle of contagion, may still, if we choose, be retained, although we acknowledge that all accessible contagious matters are non-volatile liquids or solids. It may further be added, that with the questionable exception of influenza, no endemic or epidemic spreads with the rapidity and equability, so far as area of occurrence is concerned, which would characterize it, if it were occasioned by a gas

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* *Elements of Chemistry*, p. 336.

† In virtue of this we may anticipate the administration of other medicines than anæsthetics by the lungs, although they may not be volatile. In cases of poisoning it would be of the greatest importance, if we could directly transfer to the blood an emetic or purgative, which we may hope to do along with the vapour of its solvent, aqueous or non-aqueous. Such a process, however, would be applicable only to medicines which act powerfully in small doses.

subject to a force so powerful as that of gaseous diffusion. Professor Graham's argument is still more cogent, for, according to his views, if infectious matters were truly gaseous we should never have endemics or epidemics, unless those matters were developed in immensely larger quantities than by universal acknowledgment they are. In truth, they elude every test, even when applied to large volumes of the most infected atmospheres.

From all that has been stated, it must be inferred, according to our present knowledge, that at least the great majority of the substances which are intended to be reached by disinfectants, are not volatile, and therefore are much less easily decomposed than if they were gases. We may also with reasonable confidence affirm, that they are organic products, and as such consist of carbon, hydrogen, oxygen, and nitrogen, or at least of two (if not always of three) of these elements; and that like all such compounds, they are readily decomposed by chemical reagents, especially oxidizing ones. There is no reason to imagine that infectious matters are difficult to decompose, *provided we can reach them.* The difficulty lies in reaching them. Assuming then that contagious matters are not volatile, and that they contain (to take the most complex case) carbon, hydrogen, oxygen, and nitrogen, the principles which are to guide us in the application of chemical disinfectants, will not be far to seek. Oxidizing agents will plainly be of great value, as they can readily convert hydrogen into water, and carbon into carbonic acid, and thus disintegrate and destroy the morbific matter. Substances having a great affinity for hydrogen, such as chlorine and its class, will plainly also be of great service. Substances having an affinity for oxygen will also be applicable to the destruction of organic poisons; and, finally, all reagents which by contact with organic matter can determine a new arrangement of its ultimate elements. All the powerful chemical disinfectants act in one or other or all of those ways. I shall refer to five of the disinfectants: 1, quicklime, including caustic potash and soda; 2, nitric acid; 3, chlorine; 4, aqua regia; 5, ozone. The value of *quicklime* and of the *caustic alkalis* as disinfectants, has certainly not been overrated, although it may be questioned whether our sanitary authorities have been wise in trusting to lime alone as a purifier. From the careful study of the process of natural and artificial nitrification, and from the results of the application of soda-lime in organic analysis, we have learned that the caustic alkalies and alkaline earths decompose organic matter with the evolution of ammonia, which by oxidation may become converted into nitric acid. Woodwork or stone-floors, to which a coating of limewash cannot be applied, requires only to be washed with caustic soda or soft soap, to obtain an effect identical with that which lime occasions.

2. *Nitric Acid* seems latterly to have fallen into disrepute, but certainly undeservedly. It acts more rapidly on many organic compounds than chlorine does, attacking their carbon as well as their hydrogen, and as it is not required in large quantity its application is not costly.

3. *Chlorine.*—Of chlorine, which is at present the favourite disinfectant, it is needless to speak. Its peculiar power of decomposing combinations of hydrogen, gives it, in one respect, a superiority over nitric acid, which does not decompose many of the gaseous hydro-carbons; but it should not be forgotten that it is only in the presence of light that this action of chlorine is fully displayed, so that its disinfectant influence is comparatively small in the case of dark or ill-lighted apartments, such as underground cellars, the lower cabins, or the hold of a ship, which are the very places where disinfectants are often most wanted.

4. *Aqua Regia*, as uniting the properties of nitric acid and of chlorine; each of which has peculiar virtues, the former in particular being a powerful oxidizing agent, the latter possessed of a great decomposing action over hydro-carbons, appears entitled to a high place among disinfectants. It can be cheaply procured by pouring oil of vitriol on a mixture of nitre and common salt, or by heating a mixture of nitric and muriatic acids.

One of the most rapid and effectual methods of disinfecting a large empty apartment such as an hospital ward, would be to place in one corner a vessel containing the materials for chlorine, such as oxide of manganese and hydrochloric acid, or oxide of manganese, common salt, and oil of vitriol; and in another corner a vessel containing nitric acid and a few fragments of copper, so as to evolve nitric oxide, which would spread through the apartment and form nitrous acid there, oxidizing everything oxidable which it contained, whilst the chlorine specially attacked the hydrogenous compounds. The walls might then, if necessary, be lime-washed, with a view

alike to destroy any adhering organic matter which had resisted the action of the gases, and to neutralise any traces of free acid.

5. The last of the disinfectants proper to which I refer is the singular substance ozone, which has a special interest, as being in all probability the great natural disinfectant. Its nature is still matter of speculation. Schœnbein, its discoverer, regards it as a peculiar oxide of hydrogen; Berzelius and Faraday represent it as simply oxygen in a peculiar (or allotropic) state of modification; it has been suggested that it is an oxide of nitrogen; and quite recently M. Fremy has affirmed it to be what he calls "electrised oxygen," *i. e.* oxygen modified in properties by the action of electricity upon it; a view not materially differing from that of Berzelius and Faraday. There are difficulties in the way of all these views, into which it is not necessary to enter. All that concerns our present subject is that, by different processes a substance can be developed in the atmosphere which possesses remarkable disinfectant and oxidizing properties. The oldest known method of producing the so-called ozone, is the exposure of air to a stream of friction or high tension electricity. Its odour may always be recognized in the neighbourhood of an electrical machine whilst at work. Another method is the galvanic decomposition of water, when the ozone accompanies the evolved oxygen. A third, and the most convenient method on the small scale is the exposure of phosphorus in moist air. By these processes and by certain others, air is made to acquire a striking power of oxidizing, bleaching, deodorizing, and disinfecting. We cannot doubt that every thunder-storm developes some ozone, and other processes also probably produce it. At all events the atmosphere frequently exhibits an oxidizing and bleaching power, at other times absent, which Schœnbein, Faraday, and others, attribute to the development of ozone within it.

No one who has experimented on ozone will doubt its potency. I refer to it here because there are so many reasons for believing that it is the agent which prevents the accumulation in the atmosphere of volatile organic bodies, by converting them into water, carbonic acid, nitric acid, and ammonia, that we cannot avoid looking hopefully to it as destined to prove our disinfectant *par excellence.* Certain as we are that for thousands of years miasmata, malaria, poisonous effluvia, and every gas, vapour, and volatile body developed at the surface of the earth, must have found their way into the atmosphere, and that nevertheless its purity is not sensibly affected, we must regard the constituent or condition of the air, which has secured its purity during centuries, as one demanding special study. Further, this constant process of disinfection has not interfered with the respiration of animals, so that we may fairly regard ozone as a substance applicable as a disinfectant in places occupied by human beings or by the lower animals. It is true that the power of producing influenza or catarrh has been attributed to ozone in excess; on grounds, however, almost entirely speculative. This view may or may not be true; but of this I am quite certain, that the well known impunity with which electricians expose themselves for hours together to the action on the atmosphere of large friction machines, which the dullest nostril can discover to be producing abundance of ozone, is enough to show that a large impregnation of the air with this substance, neither affects respiration nor produces catarrhal affections. We ought, therefore, I think to give special attention to ozone. It is not likely that we shall be long without discovering new processes for its production. It will be specially valuable for what are the most important, and, at the same time, the most difficult occasions for disinfection, namely, where human beings cannot be removed from infected apartments. Examples of such cases are found in a large ship at all times, and still more when its crew and passengers are attacked by disease; in the wards of an hospital, from which the sick cannot be taken; and perhaps most strikingly in a large factory, where hundreds of persons assemble daily together, many of most uncleanly habits, and at epidemic seasons fresh from infected rooms, whilst the apartments contain valuable metallic machinery, and fragile silk, cotton, linen, or woollen goods, which interpose an additional obstacle to the free employment of gaseous disinfectants. The condition of our ships as regards ventilation and wholesomeness is proverbial; and on inquiry of residents in Manchester and Glasgow I find, that where disinfection has been attempted in factories—which it rarely has—it has consisted in sending a man once a day through every room with a quantity of blazing pitch, which was supposed to fumigate into purity the atmosphere, whilst it set all the workpeople coughing.

How difficult it is to prevent the spread of erysipelas, gangrene, fever, and the like in hospitals, every medical man knows too well. Ozone at least deserves a trial as a disinfectant in such cases.

Antiseptics.—The only antiseptics to which I shall refer are two. The first is sulphurous acid : it is a powerful antiseptic, for it resists thoroughly the decomposition or decay of organic matter. In reality, however, it as much resists the development as the decay of organic bodies, and thus it doubly prevents the evolution of organic poisons. Dr. Christison long ago pointed out how small a quantity of this acid is sufficient to destroy plants. In the wine countries it has been used from time immemorial to prevent the souring or acetification of the lighter wines, when kept in casks partially filled. Professor Graham, who strongly recommends it as a disinfectant, draws attention to the fact that at Manchester the offensive effluvia of the cochineal dye-vats, which resist the action of chlorine and nitric acid, are at once destroyed by sulphurous acid. My own attention was directed to it from the employment of it on a large scale by paper-makers and others to secure the preparation of pure gelatine, a substance peculiarly liable to enter into putrefaction. Sulphurous acid can be easily prepared by burning sulphur, or by heating oil of vitriol, along with charcoal, or vegetable matter. Its corrosive action is very slight ; its disinfecting action very powerful. The sulphite of soda is now prepared in quantity at different Chemical works. The addition of a stronger acid sets free the sulphurous from its salts. As to its mode of action, if we concur with Liebig in believing that morbific matters resemble ferments in being active, only whilst undergoing a decomposition which is mainly determined by the oxygen of the air, we may suppose sulphurous acid to render the poisonous matter inert, by preventing its oxidation. This acid, moreover, is a powerful deoxidizing agent, and it may be by removing oxygen from organic poisons, that it renders them inert, by decomposing them.

Further, sulphurous acid can combine with certain elements of organic bodies, as we see in its temporary bleaching action on vegetable colours ; and it may be thus that it neutralizes morbific matters. In one or other or all of those modes, this agent may act as a disinfectant; but at all events its action is very powerful, and it deserves much more attention than it has received.

The only other substance to which I shall at present refer, is pitch oil, one of the products of the distillation of tar. It is an antiseptic of the most powerful class, and very cheap, and if not used in excess it is applicable as a deodorizer, but its own strong tarry smell interferes with its extensive use.

A FEW REMARKS ON THE PREPARATION OF SYRUPUS PAPAVERIS.

Read at the Pharmaceutical Meeting, Edinburgh, October 25, 1852.

BY MESSRS. T. AND H. SMITH.

The syrup of poppies has always proved a very unsatisfactory preparation in our hands. It may be ranked among that class of drugs and preparations which, although in their own nature, may be intrinsically good, yet, from various causes, involving variations in strength, defectiveness in those characters which give them their value, or the addition of others rendering them actually hurtful—a tendency to enter into fermentation or decomposition in some other form; from one or more such or similar causes, have unhappily come to be looked upon with distrust, and even to be entirely discarded as remedies in the practice of judicious and cautious practitioners. The lenitive electuary, scammony and its preparations, chloroform, and a remedy more recently come into notice, glycerine, may be named as examples. It is not difficult to understand how these evils may originate. The formulæ for their preparation may be bad—may be misinterpreted or carelessly followed out ; but perhaps the chief cause above all, is to be traced to that morbid desire to beat down prices to such a point, that it actually comes to be almost beyond the range of possibility to obtain the pure article.

Glycerine forms as striking an instance as any that could be named of the risk of a medicine in itself truly valuable, losing its well-deserved credit from the quantity of worthless stuff sold under that name. Glycerine is essentially emollient in its character, and, in its numerous remedial applications it is assumed to be so. This is far from being true of the greater part of what is to be found in the market. The cause of this will be easily understood. In saponifying fatty matters, if these were constituted of nothing else than the fixed fatty acids, such as margaric, stearic, and oleic, and glycerine, the latter substance could be easily obtained pure and mild

in its nature; but it must be recollected that there are very few fats that do not contain more or less of certain acrid and volatile acids, such as butyric, valerianic, acetic, &c., and when by saponification the intimate connection of the fatty constituents is broken up, all these acrid matters are left behind in the glycerine. And as glycerine is mostly obtained as a by-product, and seldom from fresh and sweet fatty matters, it need not excite surprise, if no means be used to remove these acrid substances, that the glycerine should be harsh in the extreme.*

The unhappy result of the whole matter is this, that in place of a remedy mild, soothing, and salutary in its nature, glycerine is found to be too often irritating, and even injurious, in its effects.

With respect to the syrup of poppies, the more immediate object of these remarks, the formula seems to be faulty in at least two important circumstances. The infusion with which the syrup is made, contains substances eminently unstable in their nature, and apparently no way conducive to the medicinal value of the preparation, such as albumen and mucilaginous matters. Again, the quantity of sugar is not only inefficient to prevent these substances undergoing changes, but in all probability, rather accelerates these, by supplying additional matter to act upon. The remedy offered by us to obviate these evils, is such a mode of preparing the syrup as shall exclude, as far as possible, these objectionable bodies, without interfering with the activity or characteristic action of the preparation, and permit of a larger proportion of sugar being used.

Eighteen ounces of poppy-heads are exhausted by maceration or percolation with water, at a heat of about 120°, and a soft extract is formed by evaporating the liquid by means of a steam or water-bath. The watery extract is now to be carefully worked up with repeated portions of rectified spirit, till the strength is fully dissolved out, and then, after filtration, and recovering most part of the spirit by distillation, and complete expulsion of the remainder, at a water-bath heat, a watery solution is to be formed of the soft spirituous extract. This solution is to be filtered, thus separating a quantity of insoluble matter consisting apparently of resin, colouring-matter, and earthy salts, &c. The measure of the liquid is brought to 33 fluid ounces, either by the addition of water or by evaporation, as may be, and made into a syrup, by dissolving in it, in coarse powder, 60 troy ounces of refined sugar.† The syrup when prepared should measure 76 fluid ounces, if not, it should be brought to this measure by the addition of water. The quantity of 76 ounces is what the Edinburgh College formula should give, and the proportions have therefore been framed so as to produce a quantity exactly the same.

In the first part of this process the watery solution will agree in its nature with that of the Pharmacopœia, but in a subsequent stage, while the spirit takes up all the active constituents of the watery extract, mucilaginous and albuminous matters in considerable bulk are left behind in consequence of their insolubility in this menstruum.

On comparing the quantity of sugar in the officinal formula—which, strangely enough, is only 14½ Troy ounces to 20 fluid ounces of liquid, while the proportion in syrupus aurantii is 36 to 20—with the quantity given here, it will be found that the former contains in 76 fluid ounces of syrup only 36 troy ounces, whereas the latter in the same measure contains as much as 60 troy ounces, or nearly double, without being at all in excess. The one may be viewed as a mucilaginous extract, with the addition of some sugar, while the other answers to the character of what it professes to be, a real syrup; and may, therefore, be reasonably expected to keep as well as the generality of syrups do.

That it will keep under all circumstances, we do not pretend to affirm, but so far as our experience goes, which extends to nearly a year, no fault can be found to it in this respect. The mere addition of sugar, however, to the ordinary syrup of poppies will not make it more stable; of this we are assured by Mons. Soubeiran, as the result of his own experience. But by excluding those substances which occasion fermentation, and supplying their place by a larger proportion of sugar, both a much

* About three ounces of these volatile acids were exhibited to the Meeting, which had been taken from one gallon of commercial glycerine, as also a small portion of butyric æther prepared from the same liquid.

† These proportions giving a solution near the point of saturation, and possibly, therefore, in cold weather causing a slight crystallization, can easily be modified to prevent this, when desirable, without affecting the strength of the preparation.

more elegant and permanent preparation is obtained, while from our personal experience we can affirm that its strength is not deficient.

The only similar process we know of to the one proposed is that of the Paris Codex, which orders the syrup to be prepared from the spirituous extract of poppies. We have at any rate, two objections to this formula. In the first place, the formation of a spirituous extract directly from so bulky and spongy a substance as poppy heads, cannot be entertained in this country, where spirits of wine is so expensive; and the second, equally serious objection, is the great difficulty of dissolving out with water the active ingredients from a firm resinous extract. From this circumstance we should fear there is much danger of inequality in the strength of the resulting syrup. These objections, are, however, removed by following the process here given; and by exhausting the capsules completely, a syrup is obtained of uniform strength: a most important object in such a preparation.